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Carbon isotope stratigraphy and palynology of an eastern Tethyan Cretaceous-Paleogene boundary section from Sumbar, Turkmenistan

I. Gilmour (1), C.A. Pearce (1), D. Jolley (2), M.A. Sephton (3), M. Widdowson (1), and M.A. Gilmour (1)

(1) Centre for Earth, Planetary, Space and Astronomy Research, The Open University, Walton Hall, Milton Keynes, MK7 6AA, UK, (2) Department of Geology and Petroleum Geology, University of Aberdeen, Meston Building, Aberdeen, AB9 2UE, UK, (3) Department of Earth Science and Engineering, Imperial College, London, SW7 2AZ, UK

A number of marine sequences across the K/Pg boundary have been identified that offer reasonably continuous records and relatively high sedimentation rates, most notably those near Tethyan continental margins. However, few Eastern Tethys K/Pg localities have been studied compared to the well-known North African and Southern European sites. Here we present a high-resolution stable carbon isotope and palynological record of a 2m thick section across the K/Pg boundary from the eastern Tethys at Sumbar in Turkmenistan (38°28'N, 56°14'E). The stratigraphy and inorganic geochemistry of the section used in this study, SM-4, has been described in detail by [1].

A moderately diverse series of palynofloras were recovered from the samples spanning the K/Pg boundary with a late Maastrichtian assemblage comparable to that described from Tunisia [2]. Above the K/Pg boundary a dinocyst assemblage dominated by *Areoligera* is observed, reinforcing the similarity with Tunisia, that we interpret as representing a marine transgression by eutrophic water masses with the levels of *Areoligera* decreasing up section with a decline in nutrient availability.

Carbon isotope stratigraphy of bulk carbonate and bulk organic matter reveal correlated negative carbon isotope excursions (CIEs) across the K/Pg boundary. The extent of the CIE and the concomitant drop in carbonate content parallels that observed for bulk and fine fraction carbonate isotopic analyses from other K/Pg sections. The negative CIE of bulk organic matter is similar in magnitude to CIEs for organic matter that have been observed at only a few other marine K/Pg sections. In contrast, the marked CIE observed in bulk organic matter is not evident in the carbon isotopic compositions of algal lipids. We interpret this as a geochemical signature of post-K/Pg algal blooms.

Recent analysis identified the K/Pg boundary in the Boltysk meteorite crater sediment fill and reported evidence of a marine incursion into the crater during the Tethyan post K-Pg marine transgression [3]. This marine incursion is >1m above the K/Pg boundary and is marked by the same species of *Areoligera* recorded at Sumbar. Consequently, the potential for the existence of either a highly condensed section or a disconformity within at least some Tethyan K/Pg marine sections must be considered.

[1] Alekseev, A.S. et al., (1988) *Int. Geol. Rev.* 30, 121–135; [2] Slimani, H., Louwye, S., Toufiq, A. (2010) *Palynology* 34, 90–124; [3] Jolley, D.W., Gilmour, I., Gurov, E., Kelley, S., Watson, J. (2010) *Geology* 38, 835–838.